

Improving mealtimes for PICU children and families: A Quality Improvement initiative

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Abstract

Introduction: Many critically ill children can be fed orally at some point during their paediatric intensive care (PICU) stay, but reduced appetite and other factors may impact on their intake. At home, oral feeding is usually delivered by parents; so involving parents more actively during the mealtimes in PICU may contribute to improved patient/family satisfaction. We aimed to assess the impact of a new “room service” initiative involving parents on mealtime quality and on both family and healthcare professional (HCP) satisfaction.

Methods: A prospective, single centre, before and after intervention study was designed, as part of a PICU quality of care improvement program in 2013-2016. Two questionnaires assessing oral nutrition practices and family/HCP overall satisfaction were disseminated among the parents of critically ill

children capable of oral feeding during their PICU admission and among the whole PICU healthcare professional team (nurses, nurse assistants, and medical doctors). Categorical variables were compared using the chi-square test and Likert scales were compared between groups with the Mann-Whitney-Wilcoxon test.

Results: the pre-intervention surveys were completed by 97/130 (75%) HCPs and 52 families, and the post-intervention surveys by 74/130 (57%) HCPs and 54 families. After the intervention, a marked improvement was shown for the overall quality of meal service rating by both HCPs and families (medians and IQR: 5 (5-7) to 7 (7-8) and 6 (6-8) to 8 (7-9) respectively; $p < 0.01$) and also: for the parents' involvement; in children's, families' and healthcare professional satisfaction; in meal dedicated facilities and equipment; and in perception that oral nutrition is an important aspect of PICU care.

Conclusions: Implementation of an improved "room service" initiative in the PICU was feasible and improved the perceived quality of care and satisfaction around oral feeding. This family centred care initiative can be integrated in an overall quality improvement strategy.

Introduction

Critically ill children often experience significant weight loss during their paediatric intensive care (PICU) stay which is associated with impaired outcomes (1,2). Recent guidelines recommend monitoring faltering growth occurrence and attempting to prevent it through a proactive nutritional support strategy (3). Enteral nutrition is recommended, and is mainly provided through a gastric/enteral tube, until the child is awake and capable of eating/feeding orally (3). Oral feeding is possible in some circumstances in PICU: in some chronically ill patients, some patients admitted without neurological impairment and also after extubation before PICU discharge in a significant number of children. In this last group, oral feeding/nutrition contributes to the overall nutritional intake, but rarely meets full nutritional requirements. Critically ill children often present with poor appetite and also with gastrointestinal symptoms (e.g. constipation because of opioids, diarrhoea in case of withdrawal syndrome and/or nausea and vomiting) (4). These symptoms should be prevented and treated, but improving the mealtime environment and practices may also contribute to improve oral intakes and the child's associated satisfaction with eating.

Oral nutrition, including eating meals and bottle feeding, is a process involving the recovering child, their family and PICU healthcare professionals (HCPs). Oral nutrition is part of the rehabilitation process, with the child recovering normal eating after artificial nutritional support. It is also one aspect of parenting skills and may therefore assist parents in resuming their normal parental role. Finally, oral feeding is an interactive aspect of nursing care that can be less stressful than other urgent or life-sustaining interventions and may impact positively on HCPs' psychological state. Improving the quality of oral nutrition and meals (the so called "room service" initiative) has been shown to increase food intake and patient satisfaction in other adult and paediatric settings (5–10). In neonatal ICUs, the individualised developmental care and assessment program (NIDCAP) also integrates oral nutrition as a major domain, to improve newborn outcomes (11,12). We aimed to

assess the impact of a new “room service” initiative involving parents on mealtime quality and on both family and healthcare professional satisfaction.

Methods

A prospective, single centre, before and after-intervention study was performed in a general 23-bed PICU in France from 2013 to 2016, as part of a broader quality improvement program. The PICU nutrition support team (NST), composed of a dietician, a nurse, a nurse assistant and a medical doctor, designed and launched the study together with a clinical psychologist, a consultant in paediatric intensive care medicine, the lead nurse, a registered nurse and three nurse assistants. The local institutional review board waived the need for ethical approval as this was a quality improvement project, and completion of the survey implied consent for the parents and HCPs.

The project was conducted in three phases:

1) Before intervention: A baseline evaluation of PICU oral nutrition current practices and overall satisfaction was undertaken in 2013. This consisted of two questionnaires to survey PICU families and PICU HCPs respectively (questionnaires are in supplementary tables 3 and 4 in their English and French versions). These were designed by the project team and adapted from previously published instruments (8–10) as no validated pre-existing tool matching our objectives existed. The HCPs and parental questionnaires consisted of 64 (62 closed ended) and 30 (29 closed ended) questions respectively (with a check list field or Likert scale ranging from 1 to 6). The surveys were piloted on a sample of 6 HCPs (3 PICU registered nurses and 3 PICU nurse assistants) and 4 parents to assess clarity of questions and establish face validity and they were modified slightly. The survey items were selected as they corresponded to the main issues identified by the NST, in order to assess i) the HCPs’ satisfaction of participating in oral feeding care; ii) the child’s satisfaction with eating; iii) Family satisfaction of involvement in the child’s care during meal times. The questionnaires were disseminated in a paper format.

Sample: Parents of children (0 to 18 years) admitted to the PICU were approached if their child had been capable of oral feeding during their stay; they were asked to complete a questionnaire at PICU discharge with the involvement of their child when possible. Families were excluded if they did not understand French or if they declined to participate. In a pragmatic manner (according to the project team capacities of recruitment over one year), we aimed to include 50 families over one year per phase of evaluation, with at least 20 families of children under the age of 18 months. PICU HCPs were also recruited (nurses, nurse assistants and medical doctors) and asked to complete a questionnaire about current oral nutrition practices on the PICU. We aimed to have the questionnaire completed by more than 50% HCPs out of the 130 HCPs working in the unit (75% nurses, 16% nurse assistants, 9% medical doctors).

2) The Intervention: Development of a “room meal service” initiative

TRAINING PROGRAM

First, a teaching program on improvement of oral nutrition/feeding service was developed with the collaboration of a local institutional partner specialised in food and hospitality research. Its areas of expertise included: hospitality, food service and culinary arts management (relationship between humans and food according to three main complementary themes: health/wellness – taste/pleasure – economics/management). The program was specially adapted to focus on hospitalised children and paediatric HCP requirements. It focused on specific issues: changes in meal compositions compared to home, social interaction at mealtimes; decreased appetite and disturbances in smell and taste; changes in the environmental setting of eating; and the limited food choices in hospital. It also covered how to make a meal appear attractive and appetising (using tableware, tray and plate presentation, food quantity and quality), how to behave to ensure a pleasant and reassuring atmosphere for eating (pleasant and smiling attitude, explanations on the meal composition, adapting the meal to the child’s preferences; avoiding coercive eating practices; use of language

appropriate for the child's age and comprehension; optimal positioning of the child for eating (ideally out of his bed in front of a table); and avoiding distracting noise or activities like TV). Finally, there was training on sharing this 'eating a meal' time with the family and HCPs, ensuring enough time for meals, involving parents and siblings, and home meal habits, so that the 'room meal service' was individualised to the child and family.

PICU HCPs undertook a 2-day training course in the centre for food and hospitality research, in small groups. The project team members were trained first, followed by more HCPs throughout the time period; they then implemented the training into the PICU and started informal sharing of their experience and acquired expertise with their colleagues. The new "room service" attitude was also included in the regular PICU nutrition course and in the induction course of new nursing staff.

EQUIPMENT/UNIT PROCESSES

Secondly, new crockery (tableware and service wear) and seats (highchairs, children's chairs) were bought to improve child specifications (such as making them more ergonomic and child-friendly: cutlery, plates, trays, glasses, napkins, etc.). The PICU nursing team was informed of this purchase and encouraged to use them. Examples of 'good' tray/plate presentations were made and photographed; pictures were taken (with permission) showing children and families during meal times, demonstrating examples from lessons in the training program; a selection of these photographs were displayed in the unit to increase awareness of the HCPs (supplementary digital content 3-6). Food/meals brought from home by families were encouraged and a dedicated refrigerator was purchased to store the parent-provided meals. Finally, responses from the questionnaires were analysed to improve the intervention to children', families' and HCP needs and suggestions.

Pre- and post-intervention practices are described in table 1.

3) After Intervention: In 2016, the impact of the intervention was assessed using the same questionnaires. New PICU HCPs were also included (annual turnover in this unit ranges between 5 to 15%), and parents were surveyed based on the same inclusion/exclusion criteria. Responses were compared to pre-intervention responses to assess the effectiveness of the quality improvement intervention. Children's and HCP characteristics were collected to ensure comparability of the two groups (children's age, gender and length of stay; HCP profession and years of PICU experience)

Data analysis

We aimed for an improvement in the overall satisfaction of both families and HCPs, assessed by two specific questions in the survey. The sample size was based on this primary outcome and recruitment followed a pragmatic approach based on inclusion capacities over a year time period.

Normality of data distribution was assessed using histograms and Kolmogorov Smirnov test. Data were expressed as median and inter-quartiles (IQR) for non-normally distributed variables and frequency and proportions for categorical variables. Categorical variables were compared using the chi-square test and Likert scales were compared between groups with the Mann-Whitney-Wilcoxon test. Statistical significance threshold was set at 5% ($p=0.05$) and two tailed tests were used.

Results

The pre-intervention surveys were completed by 97/130 (75%) HCPs and 52 families, and the post-intervention surveys by 74/130 (57%) HCPs and 54 families. No significant differences were found between the characteristics of the pre- and post-intervention groups (supplementary table 5).

Children had a median (IQR) length of PICU stay of 4 days (3-8), age of 9 years (4-14) and 60% of them were males. Fifty-three percent of the HCPs were registered nurses, 32% nurse assistants, and 15% medical doctors; their PICU work experience was below 3 years, between 3 and 10 years, and more than 10 years in 36%, 43% and 21% respectively.

On average, HCPs and families responded to more than 95% and 90% of the questions respectively.

Detailed answers to the questionnaires are presented in supplementary tables 3 and 4 with the before/after intervention comparisons.

Before the intervention:

At baseline, 82 (85%) HCPs perceived oral feeding and nutrition as a care which was important for their role. Seventy-two (74%) understood that oral nutrition was important for the child's recovery but reported that the PICU was poorly equipped to promote the child's enjoyment whilst eating. Most stated they acknowledged the importance of involving parents in the child's eating but this was not common practice. Most HCPs reported they enjoyed oral feeding of the child, with 53 (58%) just as much as the technical PICU care but realised it could be improved. Forty-four (94%) families reported that orally feeding their child was an important aspect of care in which they expected to be involved, but were rarely asked to. Despite this, the overall rating of oral feeding/meals was good (median 6/10, IQR 6-8).

After the intervention:

Between the two assessment phases, 15 HCPs attended the training course and disseminated this training within the team. At the post-intervention assessment point, we estimate that almost 100% of the PICU team were aware of the nutrition quality improvement program.

When compared to pre-intervention, oral nutrition practices as perceived by HCPs improved from a median (IQR) of 5/10 (5 – 7) to 7/10 (7 – 8) ($p < 0.01$). Families' rating of oral care/feeding practices increased from 6/10 (6 – 8) to 8/10 (7 – 9) ($p < 0.01$) as shown in table 2 and supplementary tables 3 and 4.

After the intervention, HCPs reported a significant increase in their beliefs that: i) oral nutrition was part of PICS/NIDCAP care; ii) children enjoyed oral feeding/ nutrition; iii) HCPs were able to offer enough diversity of food in the PICU; iv) parents' involvement in oral feeding was beneficial and v) the PICU was well equipped to offer this improved "room service" program. HCP knowledge also

significantly improved around: how to behave and present meals to their patients, and in their ability in integrating parents in mealtimes. Finally, they showed an increase in satisfaction in presenting the meal to children and teenagers (table 2).

Some family responses were also significantly improved, with parents more often involved in oral feeding their child and bringing food in from home more frequently (table 2 and supplementary tables 3 and 4). They perceived that their child had more satisfaction in eating and that the service was better in terms of equipment. Free text responses revealed that the nursing staff perceived they had limited time to dedicate to oral feeding and meal presentation. Despite this, they reported high feelings of satisfaction around being able to deliver this 'high quality service' for free on the PICU. Parents too, regretted the limited time the nursing staff had to dedicate to mealtimes, and suggested that the child should be allowed "to eat what they like" rather than what they 'should', whilst in the PICU.

Discussion

This paper describes a relatively simple quality improvement initiative around improving the quality of oral feeding/mealtimes for children able to eat in the PICU, which has significantly improved the child/family and HCP perceived satisfaction and quality of care. Similar quality improvement projects of "room service" or oral feeding/eating have been implemented in adults and found an improvement in nutrient intakes, nutritional status, patient satisfaction and reduced food waste (5,13). In general paediatrics, paediatric oncology and haemodialysis, "room service" initiatives have also been successfully shown to improve children's and families' satisfaction, and food intakes (8–10). Hwang et al. published a causal model of patient satisfaction with hospital meal services and identified key items that impacted on it. Of them, food properties (flavour, freshness, presentation, temperature, variety of food; description), interpersonal service (staff attitude, empathy, attentiveness and helpfulness, placing of food, individualisation, length of meal time and alternative food options) and environmental presentation (the environment of eating, social contact during

meal-times, quantity of food, information about food) were highlighted (7). These corresponded to the training undertaken by the nursing staff in this study.

A better knowledge and understanding of these concepts allow HCPs to adopt and implement them in their own units. To our knowledge, this approach has never been reported in the PICU setting. Our study has shown that this is feasible and successful. However, our aim was not to show any improvement in nutrient intakes, as oral nutrition is not proposed for more than a few meals in most PICU children and enteral nutrition remains the main nutrient source. Moreover, oral intake is reduced in hospitalised children, even if they are awake and theoretically capable of normal eating. In the PICU, this may be the consequence of various factors (4): i) nausea, vomiting and decreased appetite which are frequent in sedation and opiate withdrawal, pain, anxiety, or breathlessness. These symptoms may also be induced by various drugs or related to the child's underlying disease; ii) care practices (e.g. prolonged fasting times: post-extubation, prior to procedures, prior to surgery) and local organisation and environment factors (e.g. insufficient time allocated in the nursing schedule to patients' meal time, open space wards inducing stress, etc.). Fasting children experience thirst, hunger and discomfort, and may become irritable, anxious and stressed. Improving mealtimes may allow HCPs to ameliorate the child's and family's mental distress related to PICU admission which is known to impact short term and long-term outcomes like post intensive care syndrome (PICS) (14-20).

PICS has been described in paediatrics (PICS-p) and presented as a conceptual framework, focussing on physical, cognitive, emotional and social health alterations (14,15) that occur in the critically ill child after discharge. Its assessment is considered of major importance (16,17). PICS-p affects the critically ill child but also their family, who both experience an intense stress. PICS-p risk factors include among others, the severity of illness, the level of intensive care required, the PICU morbidities, the use of sedative drugs, the occurrence of delirium and sleep disturbances, but also family parameters like parent socioeconomic background, distress and coping skills (14,15,18-20).

PICS-p prevention will rely on the implementation of strategies targeting all these risk factors, including environmental control to decrease stress and anxiety. We intended to integrate our oral feeding/nutrition quality improvement project into a larger PICS-p prevention program. In our study, both parents and HCPs reported an improvement in children's satisfaction with eating after the "room service" implementation. This one initiative, integrating improved oral feeding and mealtimes into usual PICU care practices, aims to promote this earlier approach to rehabilitation after critical illness.

In neonates, the NIDCAP concept includes oral nutrition as a main aspect of care, and highlights the need for individualised, integrative and collaborative care involving parents and controlling the environment (11,12). This concept may be easily translated to infants in the PICU who may benefit from this same environment-developmental approach. Oral nutrition is also a key part of the early post-extubation rehabilitation process to limit post-intubation dysphagia (21). Feeding skill regression may lead to significant child distress around feeding and mealtimes, resulting in disordered feeding behaviours. Unfortunately, due to the paucity of paediatric research on the topic, little is known about feeding difficulties (occurrence rate, risk factors, prevention methods) of young PICU survivors (22).

Families are also impacted by PICU admission. This has been described in the adult setting as PICS-family (PICS-f) and is part of PICS-p (14,18,23). PICS-f corresponds to the development of adverse psychological outcomes such as anxiety, acute stress disorder, depression, post-traumatic stress, and complicated grief. Its prevention relies on effective communication with HCPs and involvement in their child's care. Ames et al. summarised the parents' perception of their role in PICU as being present and participating in the child's care, forming a trustful partnership with the HCPs, being informed of the child's progress and treatment plan and being considered as the person who "knows" the child best (24). Active participation in their child's care is a key coping strategy for parents in the PICU which allows for an evolution from a state of acute trauma/distress to an

adjustment and a normalization of their psychological state (25,26). Effective communication with HCPs is essential to avoid conflict, improve the parents' involvement in individualised care and prepare for the transition after PICU discharge (27). Parents suggest that ideal nursing behaviours are those that complement and facilitate their parental role, thus reinforcing family integrity (28). Oral nutrition may contribute to this PICS-f prevention strategy, as feeding a child belongs to the usual parental role, and the improvement in parental satisfaction after the implementation of our "room service" initiative supports this theory. Parents' improved satisfaction was seen, as they felt more involved in mealtimes, could bring food in from home and thus resume part of their parental role. This initiative also integrates our patient/family centred care programs which may improve family well-being and enhance the parental role in the PICU. Patient/family-centred care is a healthcare approach in which HCPs consider and integrate the needs of the patients and their families and empower them to actively participate in daily care. Family centred care specifically relies on partnering with families and sharing information and making decisions with parents(29).

Intensive care nursing is recognized as a high-stress role with potential for psychological impact such as anxiety, depression, burnout and post-traumatic stress disorder. The most common stressors are working conditions, but conflict and poor interaction within the team or with patients/relatives and family members (30–35). PICU HCP burnout is a psychological state resulting from a persistent negative reaction to work-related stress. Some strategies have been described to prevent it (36). Of them, a positive interaction with families is recommended, but can be challenging. Failure to delineate the shared roles between HCPs and parents, or by conflict influenced by physical, cultural and institutional factors can exacerbate this problem (37,38). Our "room service" initiative was intended to humanise our PICU giving HCPs the opportunity to share a pleasant, serene and less stressful care, with the child and their family. Families' and HCPs' answers to the questionnaire supported the efficacy of this strategy.

Limitations

Our quality improvement study has several limitations that warrant mentioning. Parents did not participate in the design of the questionnaires, and some aspects of oral nutrition that was important to them may be missing. We did not screen all eligible families, and families were not included consecutively. This might have led to a selection bias. We did not measure but rather estimated the percentage of HCPs informed of the intervention. We did not assess PICS-p in a holistic manner (using quality of life and functional impairment tools) but rather focussed on items potentially impacted by our oral nutrition project. A consensus on the optimal tool(s) to use to assess PICU long term effects is still lacking. Children and parents were not followed after PICU discharge which may give a short term view of the problem, and our before and after groups were not all the same, the parents were all different and a large percentage of the HCPs did not participate in the pre-intervention survey. The time interval between pre- and post-evaluation was long, but was required to develop the training program, to train the project team and to implement the project.

Conclusions

Implementation of a “room service” quality improvement initiative around oral feeding/meals in the PICU setting is feasible, and improved the perceived quality of care and satisfaction by children, parents and HCPs. This patient/family centred care approach can be part of an overall strategy to prevent PICS-p and PICS-f, in concordance with NIDCAP and early rehabilitation concepts. Future studies should focus on longer term follow up to assess the impact of such strategies. This kind of initiative should be considered as part of a broader holistic improvement approach to child and family centred care.

What do we already know?

- Oral feeding/eating of children in intensive care is often neglected and considered of little importance compared to the technical aspects of intensive care, even though it is possible in some children.
- Involving parents in the child's care promotes interaction with healthcare professionals and can reduce conflict and parental distress.

What does this paper add?

- Improving mealtimes through a 'room service initiative' is feasible in a paediatric intensive care unit.
- This quality improvement initiative improved both the child and family and healthcare professional satisfaction with oral feeding/eating which suggests that it should be considered as part of a holistic child/family centred care program to prevent post intensive care syndrome.

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Figure legends: None

Supplementary digital content

- Supplementary digital content 1: Supplementary table 3: Family responses to questionnaires and before/after comparisons; English and French versions of the questionnaires.
- Supplementary digital content 2: Supplementary table 4: healthcare professionals' responses to questionnaires and before/after comparisons; English and French versions of the questionnaires.
- Supplementary digital content 3 to 6: "Room service" mealtime
- Supplementary digital content 7: Supplementary table 5: Children's and health care professionals' characteristics

Table 1: Mealtime practices before and after intervention

Before intervention	After intervention
Nurse training on children nutritional needs, as part of the basic paediatric training	No change
Nurse training on critically ill children's specific nutrition needs, as part of the basic PICU training	No change
No specific nurse training on food service and culinary arts	Specific nurse training on food service and culinary arts, to focus on hospitalised children requirements
Use of standard hospital crockery (plastic containers, plastic cutlery and glasses, white napkins, beige trays)	Purchase and use of new child-friendly crockery adapted to children's taste and needs.
Meal service in bed	Meal service on a chair, in front of a table when possible; purchase of chairs and highchairs adapted to children anatomy
Participation of family to mealtimes allowed	Participation of families in mealtimes encouraged
Standard hospital food	Standard hospital food + food and beverage brought from home
No information of nursing staff on hygiene and storage guidelines for food brought from home	Dissemination of institution guideline on hygiene and storage guidelines for food brought from home
No time allocated in the nursing team daily routine scheduled for meal service	Allocated time for meal service planned in the nurse assistant daily routine schedule

Table 2. Items with significant improvement between pre- and post-intervention, extracted from HCP and family questionnaires

Question	N (before / after)	Before intervention Median (IQ25-75) Mean (SD) or N (%)	After intervention Median (IQ25-75) Mean (SD) or N (%)	P values
HCP Role in feeding (HCP questionnaire)				
In your opinion, oral nutrition is a less important care than others like body hygiene care.	96 / 73	2 (1 – 2) 2.0 (1.4)	1 (1 – 2) 1.5 (0.7)	0.05
In your opinion, the importance of oral nutrition varies according to the age of the child.	93 / 74	3 (2 – 4) 3.1 (1.5)	2 (1 – 4) 2.4 (1.3)	<0.01
Oral nutrition is part of an “Individualized developmental care” of young children.	95 / 74	4 (4 – 6) 4.4 (1.4)	5 (4 – 6) 5.1 (0.8)	<0.01
Oral nutrition may be included in rehabilitation care or post intensive care syndrome prevention.	96 / 73	4 (3 – 6) 4.1 (1.5)	5 (5 – 6) 5.2 (0.9)	<0.01
Child's satisfaction (HCP questionnaire)				
In your opinion, most children enjoy oral nutrition in our PICU.	94 / 74	3 (2 – 3) 3.3 (1.2)	4 (3 – 4) 3.9 (1.1)	<0.01
The oral feed choice is sufficient for children.	94 / 74	2 (2 – 3) 2.9 (1.0)	3 (2 – 4) 3.8 (1.1)	<0.01
In your opinion, most teenagers enjoy oral nutrition in our PICU.	95 / 72	2 (2 – 3) 3.7 (1.4)	3 (3 – 5) 2.6 (1.1)	<0.01
The oral food choice is sufficient for teenagers.	94 / 73	2 (2 – 3) 2.4 (1.1)	3 (2 – 4) 3.0 (1.3)	<0.01
Two care givers can swap during a child's feeds and give half a meal after one other.	95 / 68	3 (2 – 3) 2.8 (1.4)	2 (1 – 2) 2.1 (1.1)	<0.01
I am used not to interrupt the meal by another (non-urgent) care.	93 / 73	4 (4 – 6) 4.3 (1.5)	5 (5 – 6) 5.2 (0.9)	<0.01
To encourage a child to eat, I usually take the time to explain what is on the food tray.	93 / 72	3 (3 – 5) 3.8 (1.2)	5 (5 – 6) 5.1 (0.9)	<0.01
To encourage a child to eat, I usually take the time to open the sealed plastic containers before entering the room.	93 / 69	4 (3 – 5) 3.7 (1.6)	2 (1 – 2) 1.9 (1.2)	<0.01
To encourage a child to eat I usually transfer the meal onto a plate rather than leave it in the plastic container.	94 / 73	3 (3 – 5) 3.7 (1.5)	6 (5 – 6) 5.6 (0.7)	<0.01
We could improve our practices using a teaching program to HCP (serving attitude, plate and tray presentation, etc.).	95 / 72	4 (3 – 5) 4.0 (1.4)	5 (4 – 6) 4.7 (1.3)	<0.01
Family satisfaction (HCP questionnaire)				
I usually encourage the parents to be present during their child's meals.	92 / 72	4 (4 – 6) 4.3 (1.4)	5 (5 – 6) 5.0 (0.9)	<0.01
I usually encourage parents to bring some extra food from home (snacks, drinks, etc.).	92 - 72	3 (2 – 4) 3.0 (1.4)	4 (3 – 6) 4.2 (1.5)	<0.01

I usually encourage parents to bring meals from home, respecting hygiene recommendations.	94 / 71	4 (3 – 5) 3.9 (1.5)	5 (4 – 6) 4.7 (1.2)	<0.01
HCP are aware and confident with the local guidelines for hygiene and storage of food brought from home.	91 / 71	3 (2 – 4) 3.2 (1.4)	4 (3 – 5) 3.8 (1.5)	0.01
PICU healthcare professionals satisfaction (HCP questionnaire)				
You feel happy while serving oral food to a child/ teenager.	91 / 69	4 (3 – 5) 3.8 (1.5)	5 (4 – 6) 4.7 (1.1)	<0.01
Our unit is well equipped to orally feed children, in terms of plates, cutlery, trays, etc.	89 / 69	3 (3 – 4) 3.2 (1.23)	5 (5 – 6) 5.2 (0.8)	<0.01
Our unit is well equipped to orally feed children, in terms of tables, chairs, etc.	89 / 68	4 (3 – 5) 3.4 (1.4)	5 (4 – 6) 4.9 (1.0)	<0.01
Could you rate the overall practices of our PICU regarding oral nutrition (1 to 10)?	93 / 70	5 (5 – 7) 5.4 (1.7)	7 (7 – 8) 7.4 (1.3)	<0.01
Family questionnaire				
In your opinion, is oral nutrition a primary care in our PICU?	48 / 50	5 (4 – 5) 4.5 (1.2)	5 (4 – 6) 5.0 (1.0)	0.04
Were you encouraged to give oral nutrition or feed to your child? Yes	45 / 44	22 (48.9%)	32 (72.7%)	0.02
Your child got some pleasure in eating orally on PICU?	49 / 50	4 (3 – 5) 3.8 (1.8)	5 (4 – 6) 4.8 (1.4)	<0.01
In your opinion, the material we have in the unit (plates, cutlery, glasses, trays) is satisfying and makes your child eat more: ergonomic, adapted to his age?	49 / 49	4 (3 – 5) 3.8 (1.7)	6 (5 – 6) 5.2 (1.2)	<0.01
In your opinion, the material we have in the unit (plates, cutlery, glasses, trays) is satisfying and makes your child eat more: fun, colorful?	50 / 46	4 (2 – 5) 3.3 (1.7)	6 (5 – 6) 5.3 (1.0)	<0.01
Most of the time, your child has eaten: in his bed in parents or staffs arms on a chair in front of a table in front of TV	52 / 49	30 (57.7%) 12 (23.1%) 4 (7.7%) 7 (13.5%)	31 (63.3%) 6 (12.2%) 15 (30.6%) 12 (24.5%)	0.57 0.16 <0.01 0.19
In your opinion the quality of food provided to your child was adequate.	44 / 44	4 (3 – 5) 3.6 (1.6)	5 (4 – 6) 4.6 (1.5)	<0.01
Were you encouraged to bring food from home? yes	46 / 32	14 (30.4%)	19 (59.4%)	0.01
Have you brought meals from home? (main dishes; drinks; snacks)? Yes	50 / 47	20 (40.0)	30 (63.8%)	0.02
In your opinion, children should eat in front of the TV.	32 / 32	4 (2 – 5) 3.1 (1.5)	3 (1 – 4) 3.8 (0.7)	0.04
Could you rate the overall practices of our PICU regarding oral nutrition (1 to 10)?	48 / 48	6 (6 – 8) 6.0 (2.1)	8 (7 – 9) 8.0 (1.5)	<0.01

Full answers of HCP and families are displayed in supplemental digital content.

Abbreviations: HCP: healthcare professionals; N = Number of participants; PICU: paediatric intensive care unit; SD: standard deviation

Likert scale 1 – 6 with 1 = do not agree or very little and 6 = agree or very much so

Mann-Whitney-Wilcoxon test and Chi square test were used for likert scale and qualitative data analysis respectively.